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- (i) providing a sample comprising a polypeptide-containing analyte in an initial volume into an off-chip macroscale module configured to hold a volume of a milliliter to a liter;
 - (ii) capturing the polypeptide-containing analyte from said initial volume onto a plurality of magnetic beads in the macroscale module;
 - (iii) immobilizing the magnetic beads with the captured polypeptide-containing analyte in the macroscale module with a magnet;
 - (iv) washing the magnetic beads with the captured polypeptide-containing analyte; and
 - (v) releasing the washed beads into a reduced volume compared with said initial volume to concentrate the polypeptide-containing analyte;
 - b) introducing, with pressure from a pressure source, the released magnetic beads with the captured polypeptide-containing analyte in the reduced volume into a bioprocessor module that is fluidically integrated with the macroscale module, wherein introducing comprises passing the magnetic beads with the captured polypeptide-containing analyte from the macroscale module through a microfluidic channel in a microfluidic chip and into a reaction chamber in the bioprocessor module wherein the microfluidic channel is in fluidic communication with the macroscale module and with the reaction chamber;
 - c) labeling the polypeptide-containing analyte; and
 - d) detecting the labeled polypeptide-containing analyte in an analysis module fluidically integrated with the bioprocessor module.
2. The method of claim 1 wherein the polypeptide-containing analyte is selected from a biomolecule, a cell, a spore, a fungus and a virus.
 3. The method of claim 1 wherein the polypeptide-containing analyte is a toxin.
 4. The method of claim 1 wherein the magnetic beads are coupled to an affinity capture moiety.
 5. The method of claim 1 wherein the magnetic beads are coupled to an antibody, a lectin, a hapten or a receptor.
 6. The method of claim 1, further comprising eluting the polypeptide-containing analyte from the magnetic beads in the bioprocessor module.
 7. The method of claim 1 wherein the introducing comprises pumping the magnetic beads onto the microfluidic chip using an on-chip diaphragm pump comprising a series of three diaphragm valves.
 8. The method of claim 1 wherein the first initial volume comprising the analyte in the macroscale module is one milliliter to one liter.
 9. The method of claim 1 wherein the microfluidic chip further comprises an on-chip diaphragm pump comprising a series of three diaphragm valves, and the method comprises pumping the beads from the reservoir into the microfluidic chip.
 10. The method of claim 1 wherein the sample comprises cells and the method further comprises lysing the cells in the off-chip macroscale module.

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11. The method of claim 1 wherein detecting comprises fluorescent detection.
12. The method of claim 1 wherein detecting comprises a sandwich assay.
13. A sample processing and analysis system, comprising:
 - (a) an integrated set of modules comprising:
 - (i) a capturing and concentrating off-chip macroscale module comprising:
 - (1) a reservoir dimensioned to receive a liquid having an initial sample volume of a milliliter to a liter,
 - (2) magnetic beads contained in the macroscale module configured for capturing and concentrating an analyte comprising a polypeptide from said initial sample volume; and
 - (ii) a bioprocessor module comprising:
 - (1) a microfluidic chip comprising a microfluidic channel in fluidic communication with the macroscale module and configured to receive the magnetic beads from said macroscale module, and
 - (2) a reaction chamber in fluid communication with the microfluidic channel, wherein the reaction chamber is configured to receive the polypeptide analyte and for performing a capture assay on the polypeptide to produce a processed sample;
 - (b) a magnet configured to immobilize the magnetic beads with the captured polypeptide analyte in the macroscale module and to release the beads with the captured polypeptide analyte into said reduced sample volume; and
 - (c) a pressure source configured for moving the magnetic beads from the macroscale module into the microfluidic channel, wherein the magnetic beads with captured polypeptide analyte move into the microfluidic chip in a reduced sample volume as compared to the initial sample volume;
 - (d) an analysis module fluidically connected to said reaction chamber and configured to perform an analysis on the processed sample;
 - (e) a computer comprising software programmed to operate the off-chip macroscale module, the bioprocessor module, the pressure source, and the analysis module.
14. The system of claim 13 wherein the analyte comprising a polypeptide is selected from a biomolecule, a cell, a spore, a fungus and a virus.
15. The system of claim 13 wherein the magnetic beads are coupled to an affinity capture moiety.
16. The system of claim 13 wherein the analysis module comprises a fluorescence detector configured to detect fluorescence.
17. The system of claim 13 wherein the pressure source comprises a pump.
18. The system of claim 14 wherein the pump comprises a pneumatic diaphragm pump located on the microfluidic chip.
19. The system of claim 13 configured to process a plurality of samples.
20. The system of claim 13 wherein the macroscale module further comprises a cell lysis buffer.

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